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DEEN DAYAL UPADHYAY KAUSHAL KENDRA
BACHELOR OF VOCATION (SOFTWARE DEVELOPMENT)
SEMESTER – III

Subject		Course No.	Subject Title	T/P	Credit	WCH	Exam Duration	Marking Scheme		
								Internal	External	Total
Discipline Specific Course Core (Major)	Core Course-1	BVS03MAC01	Object Oriented Programming with C++	T	4	4	2	50/18	50/18	100/36
	Practical of Core Course-1	BVS03MAC02	Relational Database Management System	T	4	4	2	50/18	50/18	100/36
	Core Course-2	BVS03MAC03	Practical Lab of Object Oriented Programming with C++ and RDBMS	P	4	8	2	50/18	50/18	100/36
Multi - Disciplinary	Multi – Disciplinary Course-1	BVS03MDC04	Digital Electronics	T	4	4	2	50/18	50/18	100/36
Ability Enhancement Course		BVS03AEC05	Fundamentals of Operating System	T	2	2	1	25/09	25/09	50/18
Skill Enhancement Course/Internship/ Dissertation		BVS03SEC06	Data Structure	T	2	2	1	25/09	25/09	50/18
IKS/Value Added Course(Any One)		BVS03IKS07	Indian Knowledge System – II	T	2	2	1	25/09	25/09	50/18
Minimum Quantifying Credits					**22**					

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SEMESTER – III

Course Code	BVS03MAC01	Title of the Course	Object Oriented Programming with C++
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. To study the fundamental concepts and constructs of the C++ programming language 2. To learn the basic concepts of object-oriented programming using C++

Course Content		
Unit	Description	Weightage *(%)
1.	**Object Oriented Programming (OOP) Concepts and Introduction to C++:** − Structured programming vs. object oriented programming − Basic OOP concepts : objects , classes , encapsulation , data hiding , inheritance, polymorphism − Introduction to C++: structure of a C++ program , data types, variables, constants, expressions, statements and operators, Usage of header files − Basic I/O in C++	25%
2.	**Arrays and Working with Classes:** − Arrays in C++ : introduction, declaration, initialization of one , two and multidimensional arrays, operations on arrays − Working with strings : introduction, declaration, string manipulation and arrays of string − Classes and objects in C++ − Constructors : default, parameterized, copy, constructor overloading and destructor − Access specifier, implementing and accessing class members − Working with objects : constant objects, nameless objects, live objects, arrays of objects	25%

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3.	**Function Overloading and Inheritance:** − Functions overloading , inline functions, friend functions and virtual functions, functions, parameters passing, default arguments − Friend Function And Friend Class − Inheritance: Introduction , derived class declaration, forms of inheritance − Inheritance and member access ability, constructor and destructor in derived class, construction invocation and data member initialization	25%
4.	**Operator Overloading and File Handling:** − Operator overloading : Introduction, overloaded operators, unary operator overloading, binary operators overloading, overloading with and without friend function − File Handling with C++ − Virtual Function	25%

Teaching-Learning Methodology	Multiple teaching approaches: lecture and discussion, exploration and

Evaluation Pattern		
Sr. No	**Details of the Evaluation**	**Weightage *(%)**
1.	Internal Written/Practical Examination	50%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments.	
3.	External Examination	50%

Course Out comes: Having completed this course, the learner will be able to	
1.	Apply the knowledge of the fundamental concepts and constructs of the C++ programming language
2.	Carry out object-oriented programming using C++.

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Suggested References:	
Sr. No	**References**
1.	E Balagurusamy: Object Oriented Programming in C++, Tata McGraw-Hill Publishing Co. Ltd.
2.	Robert Lafore: Object Oriented Programming in Turbo C++, Guide, Galgotia Pub. (P) Ltd.
3.	Schaum's Outline of Programming with C++ by John Hubbard, McGraw-Hill Education; 2nd edition (June 6, 2000)
4.	Barkakati N.: Object Oriented Programming in C++, PHI. OOP's using C++ for Dummies.

On-line resources to be used if available as reference material	
On-line Resources	
1.	https://www.tutorialspoint.com/
2.	https://www.w3schools.com/
3.	https://www.javatpoint.com/

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DEEN DAYAL UPADHYAY KAUSHAL KENDRA
BACHELOR OF VOCATION (SOFTWARE DEVELOPMENT)
SEMESTER – III

Course Code	BVS03MAC02	Title of the Course	Relational Database Management System
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. To study the basics of Relational database design, normalization and ER diagrams. 2. To study the basics of PL/SQL, cursors, stored procedures and functions

Course Content

Unit	Description	Weightage *(%)
1.	**Relational Database and SQL:** – Database Management System (DBMS) – three schema architecture – Data models and examples of current RDBMS products – The relational data model: concepts and terminology, operations on data (DDL, DML), relationships and relationship types – Integrity constraints – Codd rules – Entity-relationship modeling (different types of entities, attributes, relationships and their representation in the E-R diagram) – E-R modeling case studies	25%
2.	**Structured Query Language:** – Introduction of SQL – advantages and disadvantages of SQL – Data types of SQL – Types of SQL Statements : DDL , DML , DCL , TCL – Working with SQL*Plus – overview and basic commands like ed, start, get, save, exit, connect, set linesize, set pagesize and host – Creating table and inserting data - CREATE TABLE, INSERT, retrieving data using query – SELECT, manipulating data DELETE and UPDATE modifying and removinarchatg table ALTER TABLE and DROP TABLE.	25%

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3.	**Cursors and Exception Handling:** – SELECT..INTO statement – Working with cursor : introduction, types, attributes and processing (i.e. declaring, opening, fetching and closing), using parameterized cursor – Using cursor FOR loop – Error Handling : introduction, advantages of exceptions, types of exceptions Working with user-defined exceptions – declaration, Raise_Application_Error, Pragma Exception_Init – Sqlcode and Sqlerrm	25%
4.	**Stored Subprograms, Database Triggers and Packages** – Stored procedure: introduction, creating, modifying, executing and dropping procedures – Stored functions: introduction, creating, modifying, executing and dropping functions – Database triggers: introduction, creating, modifying and dropping triggers, types of triggers – Packages: meaning, advantages, creating, modifying and dropping	25%

Teaching-Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.

Evaluation Pattern

Sr. No	Details of the Evaluation	Weightage *(%)
1.	Internal Written/Practical Examination	50%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments.	
3.	External Examination	50%

Course Out comes: Having completed this course, the learner will be able to	
1.	Understand relational database design, normalization and ER diagrams.
2.	Work with PL/SQL, cursors, stored procedures and functions

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Suggested References:	
Sr. No	**References**
1.	An introduction to Database Systems : Bipin C. Desai, Galgotia Poblications Pvt. Ltd.
2.	Ivan Bayross : SQL,PL/SQL The programming language of Oracle, 3rd revised edition, BPB Publications
3.	Kevin Loney, George Koch, Orale9i The Complete Reference , Oracle Press
4.	Understanding Database Management Systesm : S. Parthsarthy and B.W.Khalkar, First edition – 2007, Master Academy
5.	P. S. Deshpande : SQL/PLSQL for Oracle9i, dreamtech press, reprint edition 2009

On-line resources to be used if available as reference material	
On-line Resources	
1.	https://www.tutorialspoint.com/index.htm
2.	https://www.w3schools.com/
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BACHELOR OF VOCATION (SOFTWARE DEVELOPMENT)
SEMESTER – III

Course Code	BVS03MAC03	Title of the Course	**Practical Lab of Object Oriented Programming with C++ and RDBMS**
Total Credits of the Course	**4**	Hours per Week	**8**

Course Objectives:	1. To study the fundamental concepts and constructs of the C++ programming language 2. To learn the basic concepts of object-oriented programming using C++ 3. To introduce the students to the relational data model and RDBMS. 4. To teach the SQL language for accessing an RDBMS.

Course Content	
Description	**Weightage *(%)**
Practical: o Arrays and Strings o Working with objects o Inheritance o constructor and destructor o CREATE TABLE o Practical on DDL DML, DCL , TCL o PL/SQL Block o Working with cursor o Triggers and Packages	100%

Teaching – Learning Methodology	Project-based learning in small groups and Hands on training through required ICT tools

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Evaluation Pattern		
Sr. No	**Details of the Evaluation**	**Weightage *(%)**
1.	Internal Written/Practical Examination	50%
2.	Internal Continuo us Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance	
3.	External Examination	50%

Course Out comes : Having completed this course, the learner will be able to	
1.	Apply the knowledge of the fundamental concepts and constructs of the C++ programming language and the relational data model and RDBMS.
2.	Carry out object-oriented programming using C++.
3.	Use the SQL language for accessing an RDBMS

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BACHELOR OF VOCATION (SOFTWARE DEVELOPMENT)
SEMESTER – III

Course Code	**BVS03MDC04**	Title of the Course	**Digital Electronics**
Total Credits of the Course	**4**	Hours per Week	**4**

Course Objectives:	To study 1. Different number systems and conversions. 2. Basic logic gates, Boolean algebra and truth tables. 3. Simplification of logic expression using laws of Boolean algebra. 4. Sequential and combinational circuits.

Course Content

Sr. No	Description	Weightage *(%)
1.	**Gates and Boolean Algebra** – Logic gates (NOT, AND, OR, NAND, NOR, XOR, XNOR) – Properties and Symbolic Representation - Truth Table (up to 3 input) – De-Morgan's theorems – Simplification of logic expressions using Laws of Boolean algebra – Circuit Equivalence	25%
2.	**Digital Logic Circuits-I** – Karnaugh Maps – Flip-Flop (RS, D Latch) – Decoder & Encoder	25%
3.	**Digital Logic Circuits-II** – Multiplexer & Demultiplexer – Half Adder & Full Adder – Comparator – Parity Bit Generator	25%
4.	**Digital Logic Circuits-III** – 4-bit binary Adder / Subtractor	25%

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	– Controlled Buffer Register – Shift Registers – Ring Counter	

Teaching – Learning Methodology	Project-based learning in small groups and Hands on training through required ICT tools.

Evaluation Pattern

Sr. No	Details of the Evaluation	Weightage *(%)
1.	Internal Written/Practical Examination	50%
2.	Internal Continuo us Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance	
3.	External Examination	50%

Course Outcomes : Having completed this course, the learner will be able to	
1.	Different number systems and conversions.
2.	Basic logic gates, Boolean algebra and truth tables.
3.	Simplification of logic expression using laws of Boolean algebra.
4.	Sequential and combinational circuits.

Suggested References:

Sr. No	References
1.	Malvino and Leach: Digital Principles and Applications, 4th Edition.
2.	Rajaraman V: Computer Fundamentals Prentice – Hall of India Pvt. Ltd.
3.	Sinha P K: Computer Fundamentals BPB Publication (Second Edition).
4.	S K. Basandra: Computers Today Galgotia Publication
5.	Peter Norton: Introduction to Computers TMH.

On-line resources to be used if available as reference material	
On-line Resources	
1.	https://www.tutorialspoint.com/index.htm
2.	https://www.geeksforgeeks.org/
3.	https://www.javatpoint.com/

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SEMESTER – III

Course Code	BVS03AEC05	Title of the Course	Fundamentals of Operating System
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	1. To provide basic understanding of the role and functioning of an operating system. 2. To introduce the basic concepts related to processor management, memory management, process synchronization and deadlocks. 3. To impart fundamental knowledge on Linux shell environment and programming.

Course Content		
Unit	**Description**	**Weightage *(%)**
1.	**Introduction and Process Management:** – Introduction to Operating System, Functions of OS – **Different types of Operating Systems:** Real time(Hard real time system, Soft real time system), Multi-user, Time sharing/Multi-Tasking System, Distributed Operating System, Multiprogramming Operating System – **OS Structure**: Monolithic, Layered, Virtual Machine, Client-Server model – Process State, Process Control Block – **CPU Scheduling:** Introduction to process, process control block, FCFS Scheduling, SJF scheduling, Priority scheduling, Round Robin scheduling	50%
2.	**Virtual memory and demand paging:** – Memory Management: Concept, – Basic memory management techniques: o Swapping,	50%

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	o Demand Paging
	– **Multiple Partitions**
	   o Fixed-Sized Partition
	   o Variable-Sized Partition
	– **Page Replacement Algorithm**
	   a) The FIFO Page Replacement Algorithm
	   a) The Optimal Page Replacement Algorithm
	   b) The NRU Page Replacement Algorithm	

Teaching-Learning Methodology	Blended learning approach incorporating traditional classroom teaching and online /ICT-based teaching practices.

Evaluation Pattern

Sr. No	Details of the Evaluation	Weightage *(%)
1.	Internal Written/Practical Examination	50%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance.	
3.	External Examination	50%

Course Out comes: Having completed this course, the learner will be able to develop

1.	Ability to describe the role and functioning of an operating system.
2.	Understanding of fundamental concepts related to memory management, Page Replacement Algorithm.

Suggested References:

Sr. No	References
1.	Andrew S. Tanenbaum: Operating System design & Implementation, Prentice Hall International.
2.	James Peterson and Abraham Silberschatz: Operating System Concept, Addition Wesley.

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3.	Bryan Pfaffenberger - Linux Commands Instant reference, BPB Publication.
4.	Sumitabha Das - UNIX, Concepts and Applications – Tata McGraw-Hill Publications.
5.	Advanced Linux Programming – Samuel, Techmedia Publications.

On-line resources to be used if available as reference material	
On-line Resources	
1.	https://www.tutorialspoint.com/
2.	https://www.w3schools.com/
3.	https://www.javatpoint.com/

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SEMESTER – III

Course Code	**BVS03SEC06**	Title of the Course	**Data Structure**
Total Credits of the Course	**2**	Hours per Week	**2**

Course Objectives:	1. To study basic concepts related to tress and linked lists. 2. To learn the fundamentals of sorting and searching techniques. 3. To understand the concepts related to file organization

Course Content		
Unit	**Description**	**Weightage *(%)**
1.	**Introduction to Data Structures:** – Introduction to data structures, their usage, applications and advantages – Primitive and non-primitive data structures and operations on them – Linear and non-linear data structures – Introduction to stacks, operations on stacks – Applications of stacks	50%
2.	**Queues and Linked Lists:** – Queues and their uses – Types of queues : Simple queues, Circular queues, Double ended queues – Introduction to linked lists – Types of linked lists – Singly linked lists, Doubly linked lists, Circular linked lists – Applications of linked lists	50%

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Teaching-Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools

Evaluation Pattern		
Sr. No	**Details of the Evaluation**	**Weightage *(%)**
1.	Internal Written/Practical Examination	50%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance.	
3.	External Examination	50%

Course Out comes: Having completed this course, the learner will be able to develop	
1.	Understanding of the basic concepts related to tress and linked lists.
2.	Understanding of the fundamentals of sorting and searching techniques.
3.	Ability to understand the concepts related to file organization.

Suggested References:	
Sr. No	**References**
1.	Tremblay J. & Sorenson P. G.: An Introduction to Data Structures with Applications, 2nd Edition, Tata McGraw-Hill Edition, 1991.
2.	Singh Bhagat& Naps Thomas: Introduction to Data Structures, Tata McGraw-Hill Publishing Co.Ltd.,1985.
3.	R. B. Patel: Data Structure using C – Khanna Publications. ISBN: 81-87522-41-0.
4.	D. Samanta - Classis Data Structures, 2nd Edition – PHI Publication.
5.	G. S. Baluja - Data Structures through C, 4th Edition – Dhanpat Rai & Co

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DEEN DAYAL UPADHYAY KAUSHAL KENDRA
BACHELOR OF VOCATION (SOFTWARE DEVELOPMENT)
SEMESTER – III

Course Code	BVS03IKS07	Title of the Course	Indian Knowledge System – II
Total Credits of the Course	2	Hours per Week	2